RIVERS AND FLOODS

[River and Flood Division, MERRILL BERNARD *in charge*]

By BENNETT SWENSON

Heavy rains caused sudden freshets in the Belle Fourche and White River watersheds in South Dakota on July 13–14 and resulted in losses of about $61,300 and $60,000, respectively. Two lives were lost in connection with the flood in the White River. Otherwise, no damage of consequence was reported from the floods, which were mainly of a minor character, during the month.

Light, but very sudden, floods occurred in the middle reaches of the Grand River in Missouri on July 14–15 and again on the 20th. Heavy rains on July 12–14 averaged 3.31 inches over the Grand River watershed and caused the stage at Chillicothe, Mo., to rise from 1.9 feet on July 11 to a crest of 20.1 feet on the 14th. Moderately heavy rains on the 18th–19th caused a second rise in the river.

The heavy rains over South Dakota on July 12–13 and on July 18–19 between Sioux City, Iowa, and Kansas City, Mo., caused sharp rises in the middle Missouri River. Flood stage was exceeded, however, only at Nebraska City, Nebr., with a crest 0.5 foot above flood stage on July 20.

An interesting feature during the month was the phenomenally heavy precipitation that occurred over the St. Francis River Basin in Missouri and Arkansas. During the 24-hour period ending on the morning of July 4, 10.33 inches of rain fell at Fisk, Mo., and 7.45 inches at St. Francis, Ark. Due to the condition of the ground and the low stages in the streams at this time of the year, the excessive rain resulted in only light flooding in the St. Francis River at Manila and St. Francis, Ark.

Table of flood stages during July 1937

[All dates in July unless otherwise specified]

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ST. LAWRENCE DRAINAGE					
Lake Erie					
St. Joseph: Montpelier, Ohio	Feet 10	26	27	Feet 10.4	27
ATLANTIC SLOPE DRAINAGE					
James: Columbia, Va	10	20	22	14.9	21
Tar: Rocky Mount, N. C	8	27	28	9.0	28
Little: Kenly, N. C	8	28	29	9.5	29
Santee: Rimini, S. C	12	1	4	12.7	3
		28	(1)	12.5	30
MISSISSIPPI SYSTEM					
Missouri Basin					
Grand: Chillicothe, Mo	18	14	15	20.1	14
		20	20	19.0	20
Missouri: Nebraska City, Nebr	15	19	20	15.5	20
Ohio Basin					
West Fork of White: Anderson, Ind	8	13	18	9.1	14, 16
		27	27	8.1	27
Lower Mississippi Basin					
Big Lake Outlet: Manila, Ark	10	7	14	11.1	10–11
St. Francis: St. Francis, Ark	18	6	11	18.4	7, 10

[1] Above flood stage at end of month.

WEATHER ON THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, WILLIS E. HURD, *acting in charge*]

NORTH ATLANTIC OCEAN, JULY 1937

By H. C. HUNTER

Atmospheric pressure.—Over waters adjacent to Europe the pressure again averaged slightly greater than normal. Most of the ocean otherwise had pressure somewhat less than normal, the greatest known deficiency being 0.10 inch, at Reykjavik, Iceland. The Gulf of Mexico is indicated as having a very little above normal pressure.

The extremes of pressure found in the vessel reports at hand are 30.51 and 29.24 inches. The higher reading was noted during the forenoon of the 11th, approximately midway between Horta and Lisbon, on the French steamship *Capitaine Paul Lemerle*. Two liners only a few miles apart, near 47° N., 36° W., the Belgian *Emile Franoqui* and the Dutch *Edam*, each recorded the lower reading on the forenoon of the 16th.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, July 1937*

Stations	Average pressure	Departure	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Julianehaab, Greenland	29.75	−0.05	30.02	8	29.32	31
Reykjavik, Iceland	29.74	−.10	30.12	6	29.35	30
Lerwick, Shetland Islands	29.88	+.08	30.21	17	29.50	22
Valencia, Ireland	30.01	+.03	30.27	19	29.65	23
Lisbon, Portugal	30.05	+.03	30.18	9	29.86	30
Madeira	30.06	+.01	30.18	9, 14, 15	29.92	20
Horta, Azores	30.20	−.07	30.46	10	29.76	25
Belle Isle, Newfoundland	29.87	−.02	30.16	24, 29	29.46	3
Halifax, Nova Scotia	29.97	+.02	30.22	30	29.54	16
Nantucket	29.97	−.01	30.18	29	29.60	16
Hatteras	30.00	−.01	30.17	28	29.53	31
Bermuda	30.17	−.01	30.26	27, 28	30.04	13
Turks Island	30.05	−.02	30.18	1	29.95	7
Key West	30.04	+.01	30.14	10	29.93	1
New Orleans	30.04	+.04	30.18	10	29.86	1

NOTE.—All data based on a. m. observations only, with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans, which are 24-hour corrected means.

Cyclones and gales.—There was somewhat more storm activity than there had been during the quiet June just previous. Apart from the vicinity of the American coast the most notable storm occurred about the middle of the month. This was close to the Middle Atlantic States on the 12th, as a LOW of only moderate strength; but as it moved toward the east-northeast the energy increased, and near midocean some vessels met strong gales (force 9) between noon and midnight of the 16th. There was decidedly high pressure at this time over and near the Bay of Biscay, and the LOW turned more toward the north-northeast, away from the chief steamship routes, and was centered near Iceland late on the 18th with somewhat diminished force.

From the northeastern part of the Gulf of Mexico northward near the United States coast a disturbance usually of small size but considerable strength passed just before the close of the month. Midnight of July 31 found this storm in about the latitude of New Jersey. The greatest wind force reported by any vessel meeting it was 11, and it was only in connection with this LOW that any July vessel report from North Atlantic waters has mentioned that force. A detailed account of this disturbance appears elsewhere in this issue.

Fog.—As is expected in July, there was considerable fog over North Atlantic waters to northward of the fortieth parallel. The western areas had, as a rule, somewhat less fog than during the month of June just preceding; but the eastern areas to northward of 45° latitude noted a little more fog than June had brought. Reports indicate the eastern 5° square of greatest occurrence to have been that from 45° to 50° N., 30° to 35° W., with 10 days, chiefly after the 17th. Close to the British Isles fog was experienced mainly on the opening days and about the 12th and 18th.

In the Grand Banks region fog was prevalent most of the month, but somewhat less than usual from the 9th to 16th. The square 40° to 45° N., 45° to 50° W., led all others anywhere in the North Atlantic, with 20 days. Near Cape Cod and Western Nova Scotia the square 40° to 45° N., 65° to 70° W., had 18 days.

Waters near Long Island had much less fog than during June, and the decrease near the New Jersey coast and Delaware Bay was even more marked. A very little fog was met, however, still farther southward, even near the coast of North Carolina.

Two accidents due to fog were noted as occurring near the Massachusetts coast. In the more serious of these, on the 12th, Handkerchief Shoals lightship was struck and damaged enough to compel withdrawal for repairs, one of the crew suffering injury.

OCEAN GALES AND STORMS, JULY 1937

Vessel	Voyage		Position at time of lowest barometer		Gale began July—	Time of lowest barometer July—	Gale ended July—	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN			° ′	° ′				*Inches*					
Turrialba, Am. S. S.	Boston	Tela	16 00 N.	87 24 W.	2	7a, 3	2	29.82	SE.	E, 3	SE.	SE, 6	
Black Hawk, Am. S. S.	Rotterdam	New York	49 53 N.	7 42 W.	3	Noon, 3	3	29.65	NW.	S, 4	NW.	NW, 8	S-NW.
Nashaba, Am. S. S.	New Orleans	Havre	39 56 N.	55 23 W.	7	8a, 7	7	29.78		SSW, 8		SSW, 8	
Katanga, Belg. S. S.	Lobito	Antwerp	9 30 N.	16 30 W.	12	11p, 12	13	29.86	WSW.	NW, 9	WNW.	NW, 9	WSW-NW-W.
Do	do	do	14 39 N.	17 57 W.	16	11a, 14	16	29.90	N.	N, 2	NNE.	N, 7	
Granada, Hond. S. S.	Key West	Frontera	18 54 N.	92 36 W.	14	6a, 15	14	29.91	SE.	ESE, 4	SSE.	SSE, 6	
Duivendrecht, Du. M. S.	Killingholm	Houston	36 42 N.	50 38 W.	15	Noon, 15	15	30.01	SW.	SW, 8	WSW.	SW, 8	SW-W.
Emile Francqui, Belg. S. S.	Antwerp	New York	47 26 N.	36 02 W.	15	—, 16	16	29.24	SW.	SW, 8	NW.	NW, 8	Steady.
Edam, Du. S.S.	Rotterdam	do	47 24 N.	36 16 W.	15	9a, 16	16	29.24	ENE.	WSW, 6	NNW.	NNW, 9	SSW-NW.
Collamer, Am. S. S.	New York	Havre	48 38 N.	28 46 W.	16	10p, 16	17	29.34	S.	SSW, 8	W.	SSW, 9	S-SW.
Boston City, Br. S. S.	Montreal	Cardiff	51 55 N.	10 15 W.	19	8p, 20	21	29.80	SW.	SW, 8	W.	SW, 9	Steady.
Blankaholm, Swed, M. S.	Gothenburg	Montreal	59 12 N.	26 10 W.	20	8p, 20	21	29.29	WNW.	NW, 8	NNW.	NW, 9	W-NW.
Coloradan, Am. S. S.	Cristobal	Ponce	13 06 N.	74 45 W.	25	4p, 25	26	29.80	ENE.	E, 6	E.	E, 6	None.
West Kyska, Am. S. S.	Bremen	Tampa	44 42 N.	20 02 W.	26	2p, 26	26	29.79	SSE.	SSE, 7	SSE.	SSE, 8	SSE-W.
Mariana, Am. S. S.	Tampa	New Orleans	27 47 N.	83 41 W.	29	9a, 29	29	29.80	SE.	NW, 5	S.	SE, 8	SE-SW-N.
Tela, Hond. S. S.	Charleston	Philadelphia	33 10 N.	78 08 W.	31	1a, 31	31	29.75	NE.	NE, 9	NW.	NE, 9	NE-NW.
Capitaine Paul Lemerle, Fr. S. S.	Newport News	San Pedro Macoris.	36 00 N.	75 00 W.	31	Noon, 31	31	[1] 29.92	NE.	NNE, 10	N.	NNE, 10	NE-NNW.
Gulfpride, Am. M. S.	Philadelphia	Port Arthur	36 00 N.	75 07 W.	31	Noon, 31	31	29.82	NE.	NNW, —	N.	N, 8	NE-NNW-N.
Peten, Am. S. S.	Habana	New York	35 08 N.	75 12 W.	31	Noon, 31	31	29.79	W.	NW, 9	NW.	NW, 9	W-NW-NNE.
Coppename, Am. S. S.	Castilla	Boston	[2] 36 08 N.	74 06 W.	31	2p, 31	31	29.40	SSW.	N, —	NW.	NW, 9	SSW-N-NW.
Santa Lucia, Am. S. S.	New York	Cristobal	36 30 N.	73 42 W.	31	2p, 31	31	29.56		ENE, 4		NW, 8	E-ENE-NW.
Turrialba, Am. S. S.	Boston	Habana	37 42 N.	70 50 W.	31	7p, 31	[3] 1	29.64	SSW.	SSW, 7	WSW.	SW, 9	E-SSW-SW.
Medea, Du. S. S.	New York	Inagua	36 48 N.	73 54 W.	31	3p, 31	31	29.58	E.	NNW, 11	NNW.	NNW, 11	E-NNW.
NORTH PACIFIC OCEAN													
Skramstad, Nor. M. S.	Yawata	Taruna, D. E. I.	[2] 17 57 N.	128 00 E.	1	4p, 1	2	29.42	ESE.	ESE, 8	S.	ESE, 8	
General Sherman, Am. S. S.	Yokohama	San Francisco	[2] 47 51 N.	178 08 W.	2	2a, 2	1	29.74	E.	SSE, 7	SSE.	SSE, 9	E-SSE.
Pierre L. D., Fr. M. S.	do	Saigon	18 50 N.	119 00 E.	3	8a, 3	3	29.47	NW.	WNW, 9	WSW.	WNW, 9	NW-SW.
Golden Mountain, Am. S. S.	do	San Francisco	37 03 N.	148 52 E.	13	Noon, 13	13	30.01	SSE.	SSE, 6	SSE.	S, 10	None.
Birmingham City, Am. S. S.	Balboa	Los Angeles	14 48 N.	94 30 W.	21	5a, 22	22	29.76	N.	N, 8	ESE.	N, 8	

[1] Barometer uncorrected.
[2] Position approximate.
[3] August.